The National Weather Service

Automated Flood Warning Systems (AFWS)

Data Partner Requirements Document

Version 1.1

National Weather Service
Office of Climate Water and Weather Services

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Background

On September 21, 2009 the National Weather Service (NWS) launched a new Automated Flood Warning Systems (AFWS) web interface which ingests raw data provided by Automated Local Evaluation in Real Time (ALERT) and Integrated Flood Observing and Warning System (*IFLOWS*) networks and processes the raw data for display via the web and packages the data for dissemination.

The new AFWS site provides 5-minute updates in data formats such as:

- Color-coded precipitation amounts in relation Flash Flood Guidance (FFG)
- Keyhole Markup Language (KML)
- Really Simple Syndication (RSS) data observations and alerts
- Shapefiles
- National and area maps
- Tabular data output
- SHEF PP, PC, and HG data formats for NWS operations

AFWS web interface URL:
http://afws.erh.noaa.gov

AFWS User Guide URL:
http://afws.erh.noaa.gov/afws/AFWS_End_User_Guide.pdf

Intended Document Audience

The intended audience of this document are operators of existing ALERT and IFLOWS networks and(or) public/private organizations that desire to establish an ALERT or IFLOWS network of precipitation/water level stage sensors and intend to use AFWS for dissemination of their data to the public via the its web interface and delivery to NWS for hydrologic operations.

Raw Data Requirement

In order to process and store incoming data on the new AFWS system(s), **three** requirements have to be met: **All transmitted data must be in raw ALERT message format; all ALERT/IFLOWS data must streamed via Internet Protocol (IP) through the Data Partner's connection to the Internet; and the Internet connection must utilize static addressing to a singular or range of IP addresses.** The IP data stream consists of a sequence of digitally encoded coherent signals (packets of data or datapackets), which can be processed by the AFWS servers that are operated and maintained by the NWS.

As mentioned above, AFWS requires raw ALERT messages via IP data streaming. To meet this requirement, Data Partners have the option to implement either a hardware or software methodology of data decoding and transfer.

Beginning with hardware solutions, one possible option is the Timewave DSP-D300. This device is a digital signal processor that can decode and filter radio reporting gauge data packets that transmit in ALERT format. The DSP-D300 connects to the audio output of a radio receiver and encapsulates the raw ALERT/IFLOWS audio data into IP datapackets for transfer to the AFWS servers via IP data streaming. Additional information about the Timewave DSP-D300 can be obtained at:

http://www.timewave.com/support/DSP-D300/DSPD300c.htm

Another possible option for Data Partners to provide IP streaming ALERT data via the Internet is software. One such software approach is DEC Data System's Datawise. Several NWS Data Partners are streaming ALERT data to the AFWS servers via this method. Additional information about the Datawise software can be obtained at:

http://www.decdatasystems.com/

Additionally, it is known that raw ALERT/IFLOWS data could be streamed via an IP enabled terminal server, but no terminal server testing has been completed by NWS and any R&D of a terminal server approach would need to be completed by the Data Partner.

The NWS does not endorse any one company or product. The companies and products listed above are for reference purposes only. It will be up to the Data Partner to decide the best way for their program to stream ALERT data to the AFWS servers via IP data streaming.

Figure one (1) depicts a simple network diagram of data transfer from a Data Partner to NWS AFWS servers.

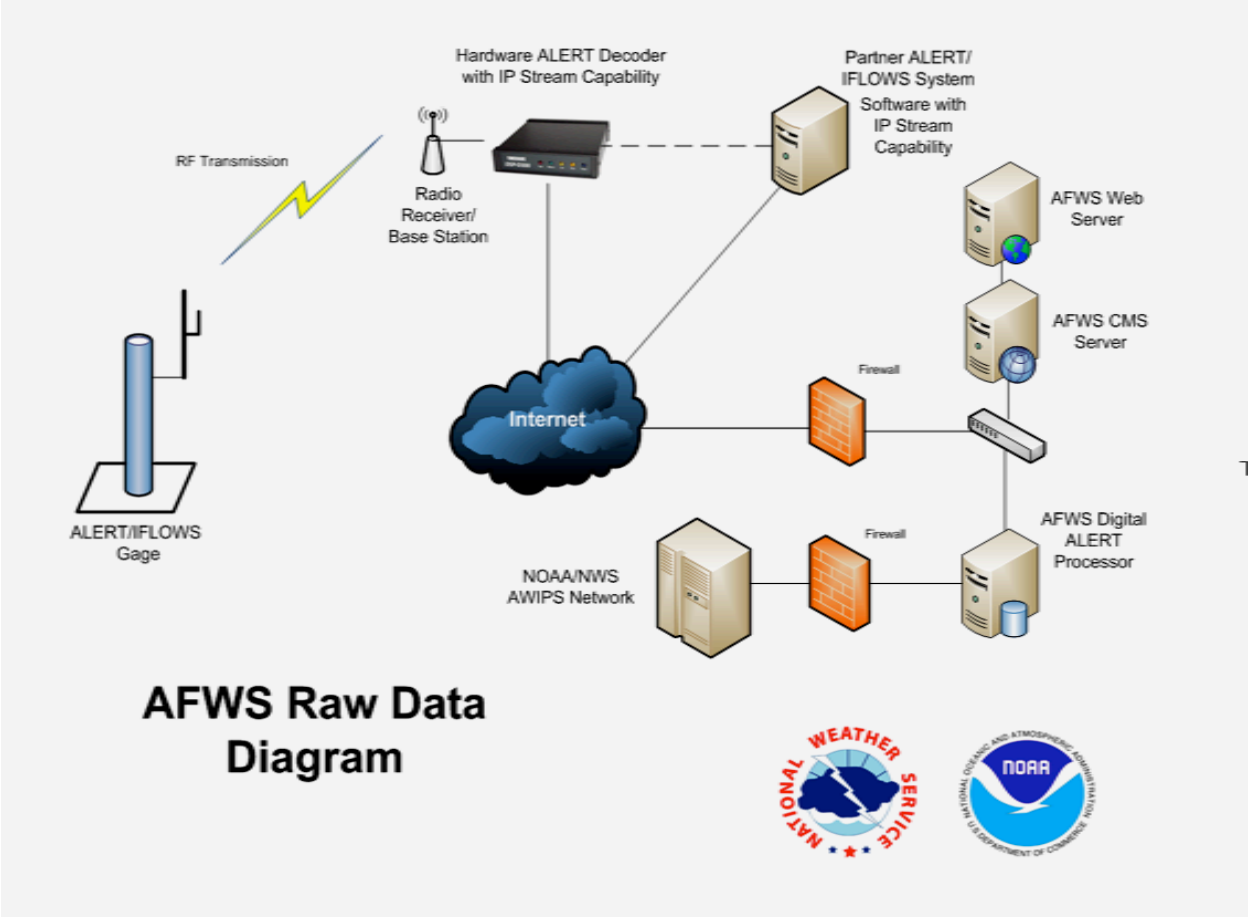

Figure 1: AFWS ALERT Data Flow Diagram

AFWS Configuration Management System

An AFWS Configuration Management Systems (AFWS CMS) module was deployed as part of the larger NWS CMS web interface. This AFWS CMS module allows NWS ALERT/IFLOWS Data Partners and NWS Weather Forecast Office personnel to manage configuration and calibration settings of sensors within their area of responsibility for display on the web via the AFWS web interface. During the implementation phase of a new AFWS Data Partner, AFWS

CMS training will be provided along with an AFWS CMS user guide. Figure two (2) depicts the AFWS CMS web interface.

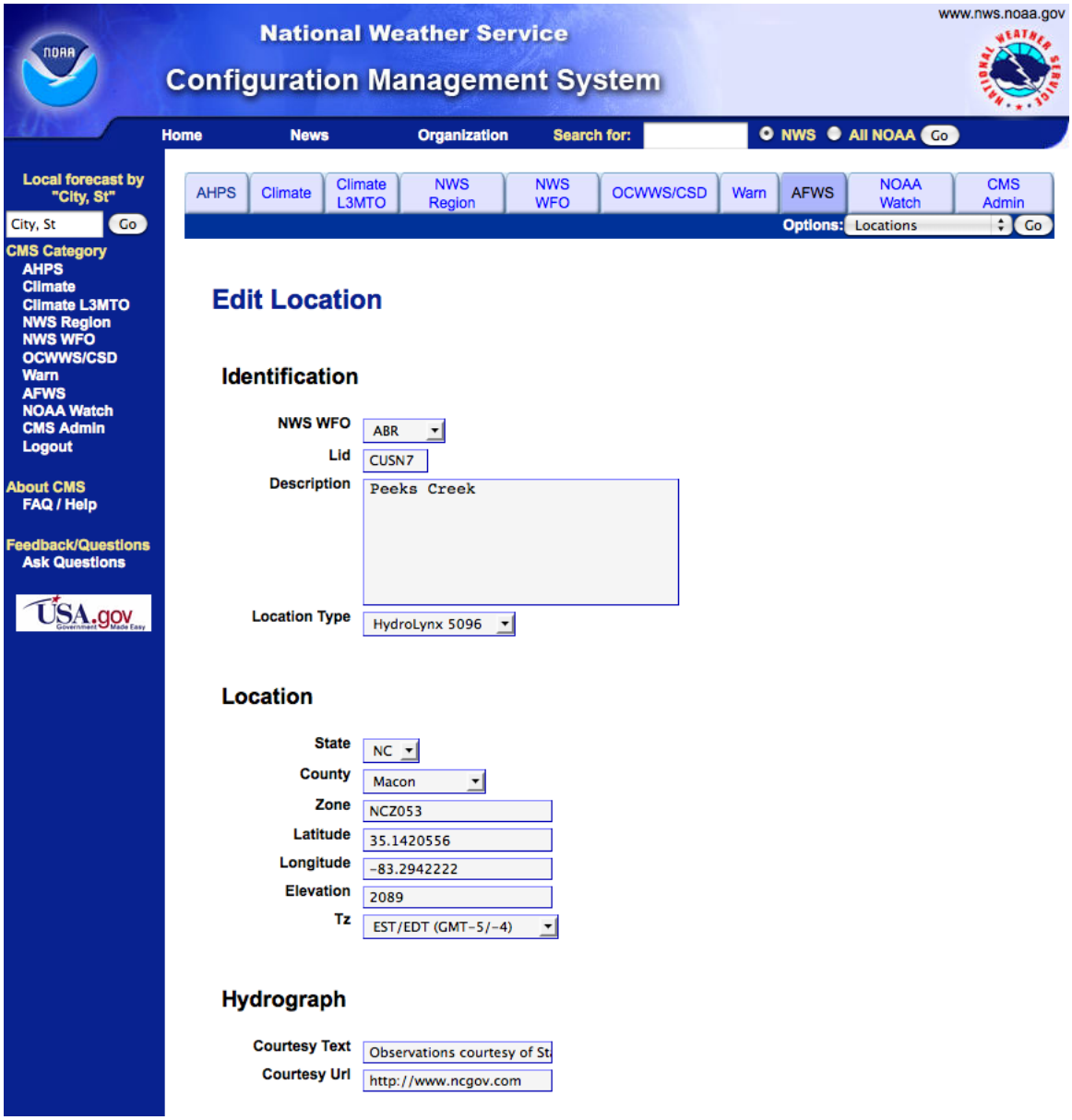

Figure 2: AFWS CMS Web Interface

Location/Sensor Configuration Data Requirements

For the AFWS system to process and distribute ALERT/IFLOWS data, the following configuration data are required on a per location / per sensor basis:

Gauging Location Configuration Data –

Site Name (*location name*)
State
County
Latitude (*in decimal degrees*)
Longitude (*in decimal degrees*)
Elevation (*in feet*)
Time Zone
NWS Weather Forecast Office (*WFO location should be associated with*)
NWSLI (*SHEF ID*)

Sensor Configuration Data –

Sensor Type *(precipitation / water level stage*)
Transmit ID
Report Increment Units
Base Value (*calibration offset value*)
Cycle Size
Data Validation Settings

Due to usage of different terms within the ALERT/IFLOWS vendor hardware and software community, NWS will help new Data Partners determine what information from a Data Partner system matches the terms of the NWS AFWS program.

AFWS Program Contact Information

For additional information about becoming an AFWS Data Partner, please contact John Bradley, AFWS Program Manager at National Weather Service Headquarters, Office of Climate, Water, and Weather Services via email at john.bradley@noaa.gov or by phone at (301) 713-0006 ext. 154.